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CONTENTS

PAGE

ASIA

INDIA

- Pesticides, Cause of Mystery Disease
(THE HINDU, 6 Jul 77)..... 1

SOUTH KOREA

- U.S. Ships Blamed for Oil Slick
(Various sources, 20, 23 Jul 77)..... 2
- Beaches Contaminated by Oil
Ships May Be Seized

EASTERN EUROPE

BULGARIA

- Environmental Problems Discussed at State Council Meeting
(RABOTNICHESKO DELO, 30 Jun 77)..... 4
- Ecological Commission Rejects Construction of Power
System
(Ruen Krumov; OTECHESTVEN FRONT, 30 Jun 77)..... 7
- Acute Water Shortage Anticipated by Year 2000
(Nasko Mandadzhiev; ANTENI, 29 Jun 77)..... 11

CZECHOSLOVAKIA

- Czechoslovak Water Management Discussed
(Lumir Hrudka; RUDE PRAVO, 4 Jul 77)..... 17

CONTENTS (Continued)

Page

NEAR EAST AND NORTH AFRICA

IRAN

| | |
|--|----|
| Pollution Prevention in Steel Industries (TEHRAN JOURNAL, 11 Jul 77)..... | 20 |
|--|----|

WESTERN EUROPE

DENMARK

| | |
|---|----|
| Administrative Aspects of Environmental Agency Examined (Carl Hansen; BERLINGSKE TIDENDE, 28 Jun 77)..... | 21 |
| New Law To Prohibit Waste, Promote Recycling of Products (Carl Hansen; BERLINGSKE TIDENDE, 23 Jun 77)..... | 25 |
| Framework, Shortcomings in Implementing Environmental Law Reviewed (Carl Hagen; BERLINGSKE TIDENDE, 27 Jun 77)..... | 27 |
| Protection of Wetlands Preserves Ecology Beyond Borders (Palle Tornqvist; BERLINGSKE TIDENDE, 27 Jun)..... | 31 |
| Atmospheric Pollution Increases Risks for New Ice Age (Willi Dansgaard Interview; BERLINGSKE TIDENDE, 22 Jun 77)..... | 34 |

GREECE

| | |
|---|----|
| Increased Newborn Deformities Laid to Elefsis Pollution (Dim. Belsis; I VRADYNI, 25 Jun 77)..... | 39 |
| French Experts To Study Athens Pollution (AKROPOLIS, 7 Jul 77)..... | 41 |

WEST GERMANY

| | |
|---|----|
| FRG River Pollution Reviewed (DER SPIEGEL, 13 Jun 77)..... | 42 |
| Rhein Coal Works Restore Old, Open New Mining Areas (Eberhard Krummheuer; HANDELSBLATT, 10/11 Jun 77). | 47 |

PESTICIDES, CAUSE OF MYSTERY DISEASE

Madras THE HINDU in English 6 Jul 77 p 16

[Text]

NEW DELHI July 5.

The mystery disease that selectively struck Harijans in Karnataka four years ago is now believed to have been caused by pesticides.

This conclusion has been reached by the National Institute of Nutrition (NIN) which conducted a detailed study on the incidence of the disease that was unknown in India eight years ago.

The disease which involved knee and hip joints was confined to a few villages in Shimoga and Chikmagalur districts. It affected predominantly family members of the Harijan community.

The NIN study team noted that the disease (now named handigodu syndrome) started to appear only after spraying large amounts of pesticides on paddy field was introduced in that area.

The scientists observed wholesale mortality of fishes and crabs after spraying operations, and they also noticed that crabs and fish were consumed liberally a few days after spraying.

Till about 10 years ago the Harijans got one rice meal from landlords as part of wages. But of late the Harijans had been consuming a lot of crabs because the landlords were reported to have discontinued the practice of serving rice meal.

According to the NIN, crabs have great capacity to accumulate large amounts of toxins such as DDT

and cadmium "and it is likely that population groups who consume such crabs are exposed to the injection of pesticide residues".

The NIN found that the incidence of this disease has decreased in the last two years during which the pesticide use had also declined suggesting a link between the two.

"Since ten or more varieties of pesticides had been used the exact chemical nature of each one of them must be understood", the NIN said.—Samachar.

U.S. SHIPS BLAMED FOR OIL SLICK

Beaches Contaminated by Oil

Seoul THE KOREA HERALD in English 20 Jul 77 p 8

[Text]

PUSAN — A slight collision of two American container ships was yesterday claimed to have led to the oil contamination of the major beaches near here.

A task force of the Pusan District Prosecutor's Office on public nuisance yesterday announced that the oil slick contamination of the beaches including the renowned resort of Haeundae was attributed to the fuel leakage from the President Truman, a 16,100-ton American container ship.

Senior Prosecutor Kim Hong-sok, head of the task force, said his team found the full-cellular vessel had its fuel tank damaged by a collision with the Export Builder, another American container ship, near Oryuk-to off Pusan July 3.

The former was at the time of the collision anchoring near the islands with its fuel tank filled with 1,000 drums of oil. The latter was heading for Pusan on its way from Japan. The 10,659-ton Export Builder hit the port of the President Truman accidentally to leave a 160cm-long, 100cm-wide gap on the latter's fuel tank, the prosecutor said.

The fuel leaked out and the tides flowing at 1.25 knots an

hour carried it ashore along the Haeundae beach. It kept spreading northward to pollute other beaches such as Songjong, according to the announcement.

The President Truman was originally scheduled to sail to Hongkong to pick up Korea-bound cargoes. However, it is now berthed at a shipyard of Hyundai Mipo Dock to undergo an extensive repair work on her damage, the prosecutor said.

The Export Builder departed from Pusan July 9 for the United States. The

prosecution yesterday decided to book the American ship, according to Prosecutor Kim, on charges of contaminating the beaches.

Ships May Be Seized

Seoul THE KOREA TIMES in English 23 Jul 77 p 4

[Text]

PUSAN — Merchants at Haeundae beach and fishermen in Ilgwang and Changanmyon near here will request that the court seize the U.S. container ship President Truman, which was blamed for the oil contamination of the beach and the fishermen's farms of clams and kelp.

The action is to be compensated by the American ship of 16,000 ton-class for the damages caused by the pollution of bunker-C oil which flowed out into the sea from the ship on July 3.

The merchants and fishermen decided yesterday to investigate the amount of damages caused by the pollution and asked the ship to pay compensation.

The President Truman is now being repaired at the dock of the Hyundai Shipbuilding Co. in Ulsan and is scheduled to leave Korea after her repairs.

Prof Pae, Pyong-tae of Korea Merchant Marine College here said that the merchants and fishermen can be compensated for their damages through civil procedures since an international pact guaranteeing the compensation for damages caused by sea pollution was proclaimed in 1969.

CSO: 5000

BULGARIA

ENVIRONMENTAL PROBLEMS DISCUSSED AT STATE COUNCIL MEETING

Sofia RABOTNICHESKO DELO in Bulgarian 30 Jun 77 p 1

[BTA report: "State Council Session"]

[Text] The State Council of the Bulgarian People's Republic held a meeting yesterday. The meeting was chaired by Todor Zhivkov, State Council chairman.

The basic directions for the protection and reproduction of the environment in the Bulgarian People's Republic were discussed and adopted.

The preservation of the environment is a vital national and all-human problem. To the Bulgarian Communist Party and Bulgarian People's Republic this problem is an inseparable part of the concern for man and for improving the living environment and the health of the people. It is an important factor in upgrading national economic effectiveness.

Under the people's regime and, particularly after the historical April 1956 BCP Central Committee Plenum, many successes were achieved in the field of environmental protection and improvement. A socialist environmental protection legislation was created. A system of central and local organs in charge of environmental protection was established. Ecological requirements became mandatory in the planning and building of new production capacities and in the modernizing and reconstructing of existing ones. A broad public environmental protection movement developed in the country.

Despite violations committed in some areas, the natural environment in the Bulgarian People's Republic is favorable both as an environment for human life and a source of resources for the development of production forces.

However, the dynamic socioeconomic development of the country calls for a new and more effective approach to the comprehensive solution of environmental protection problems in accordance with the requirements governing the quality of the environment and the socialist way of life.

In accordance with the stipulations of the 11th BCP Congress and July BCP Central Committee Plenum on upgrading the effectiveness and quality in all realms of social activities, the State Council established the main directions to be followed in the application of the multiplication approach in this field as well.

The strategic direction in the comprehensive activities aimed at the rational utilization of natural resources and the preservation and reproduction of the environment will be the elaboration and utilization of standard solutions, plans, and comprehensive systems for waste-free, low-waste, and other progressive technologies, and closed water consumption cycles in all similar production facilities, territories, and activities.

These efforts will be entirely based on a scientific system of dynamic norms consistent with the requirements of the general plan for the territorial location of production forces and the single territorial-structural plan of the Bulgarian People's Republic.

The State Council also indicated the tasks and stages in the purification of the air, water, and soil, the preservation of the genetic stock and recreation resources, and the tasks related to improving the quality of the environment in settlements and territorial-production complexes.

The directions to be followed in the further advancement of the organization and management of activities related to the preservation and reproduction of the natural environment were earmarked. The role of control will be enhanced and so will the responsibility of the administrative organs. Strict penalties will be imposed on violators for the nonfulfillment of planned measures.

The great role of the Fatherland Front and the other social organizations and mass information and propaganda media was stressed in the evermore extensive development of the public movement for environmental protection and its conversion into a national cause.

The global and all-human nature of problems related to environmental protection calls for broad and lasting international cooperation. It is emphasized that our country actively supports the suggestion of the Soviet Union on convening European congresses and international conferences on environmental protection problems and the development of power industry and transportation, as well as the conclusion in Geneva of an international convention banning the military or any other hostile use of means affecting the natural environment.

Making its contribution to the strengthening and broadening of international cooperation on problems of environmental protection, in the Helsinki spirit the Bulgarian People's Republic expresses its readiness to cooperate on a bilateral and multilateral basis with all European and neighboring countries in the solution of regional and global environmental protection problems through joint efforts and on the basis of joint interests.

The State Council assigns to the Council of Ministers the elaboration of corresponding programs and the organization of and control over the overall implementation of the tasks stemming from the basic directions in the preservation and reproduction of the natural environment in the Bulgarian People's Republic.

At its session the State Council also ratified the Ukase on Work with Critical Publications.

The ukase establishes the organization of the work of ministries and other departments, establishments, organizations, and people's councils related to critical publications in mass information media--newspapers, periodicals, radio, television, and documentary motion pictures, and relations among editors and state organs and organizations on the subject of critical publications, and the management and control of such activities as well as responsibilities related to nonfulfillment of stipulated obligations.

The basic directions for the preservation and reproduction of the natural environment in the Bulgarian People's Republic and the Ukase on the Work with Critical Publications will be published.

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BULGARIA

ECOLOGICAL COMMISSION REJECTS CONSTRUCTION OF POWER SYSTEM

Sofia OTECHESTVEN FRONT in Bulgarian 30 Jun 77 p 2

[Report by contributor Ruen Krumov on the conclusion of the ecological commission: "No construction whatever in 'Parangalitsa' and in its buffer zone!"]

[Text] As was already reported in OTECHESTVEN FRONT issue No 10042, on the recommendation of the Environmental Protection Committee, three commissions were appointed to provide expert conclusions related to the planned construction in Rila aimed at tapping the left-hand tributaries of the Struma River for the water supply of Sofia, Stanke Dimitrov, and Blagoevgrad. These commissions were to issue their opinions on the water balance and on the location of the Pastra Dam, assess the impact of the change in the microclimate on cultural monuments in the Rila Monastery and, finally, the ecological changes which would occur in the Parangalitsa Reserve and its buffer zone and at the Rila Monastery should such construction take place.

Perhaps the most important is the view of the last commission which included noted Bulgarian ecological scientists: Professor Engineer Simeon Nedyalkov, chairman of the commission of the Forest Institute of the BAN [Bulgarian Academy of Sciences], Professor Kiril Mishev from the Earth Sciences Center of the BAN, Docent Zhelez Donchev from the Forest Institute of the BAN, Senior Scientific Associate Nikolay Boev from the Scientific Coordination Center for the Preservation and Reproduction of the Environment of the BAN, Senior Scientific Associate Ivan Bondev from Sofia University, and Senior Scientific Associate Vladimir Popov from the geographic institute of the BAN. The commission concluded its work and submitted its ecological experts' opinion.

Our associate Ruen Krumov studied the experts' conclusion of this commission and sought in it answers to questions asked by the readers in the course of the discussion sponsored by OTECHESTVEN FRONT, the Bulgarian Radio, and the newspaper PIRINSKO DELO.

What were the violations noted by the commission in the current construction of the Belmeken-Sestrimo power system?

Construction has reached the highest part of the reserve. Article 16 of the Law on the Defense of Nature was violated, prohibiting the commission of all actions violating original natural conditions in a reserve.

At an altitude of 2,000 meters, within the range of the reserve, a collection canal and a tunnel were dug and the materials were taken outside the reserve. Water tapping at the 2,000 meter elevation will remove the waters of the cirque of the Blagoevgradska Bistritsa River covering an area of 168.7 hectares.

A work road was made along the right bank of the Blagoevgradska Bistritsa. In the course of the construction and utilization of the road, as a result of the noise (explosives, engines, bulldozers, and so on) abnormal living conditions were created for the animals in the reserve as a result of which some mammals and birds have moved away. The rare and noble deer and the wildcat moved to the Chakalitsa site.

Other violations have been committed in the reserve and within its established but as yet unlegalized buffer zone: camp fires are started, sheep are let to graze, and so on.

What will be the impact on the environment from the building of installations at elevation 1,500?

The digging of a tunnel at elevation 1,540 will affect the most interesting and highly productive forest plants in the reserve. They will be destroyed. The noise of the construction operations will definitively chase away the game. The material extracted from the tunnel will pollute the waters of Blagoevgradska Bistritsa, thus destroying the fish and the hydraulic biological output of the river which, according to zoologist Nachko Nachev equals 12 kg per square meter of water area. The digging of a tunnel will mark the definitive loss of the reserve.

Is the Energoproekt proposal for the reserve to be crossed by a siphon in its buffer zone acceptable?

The making of a siphon crossing the buffer zone would have the same harmful consequences to the reserve. The reserve has already been sufficiently degraded as a result of the construction conducted at elevation 2,000. The making of a water derivation at elevation 1,540 or below it, in the area of the buffer zone, would mean the end of the reserve. Consequently, the commission believes that the digging of any water supply canals, tunnels, and siphons whatever through the Parangalitsa Reserve and its buffer zone are absolutely inadmissible. According to the commission construction at elevation 1,500 will make deep changes in the mountain. The digging of about 160 km of canals and tunnels, and of roads of the same

length, and of residential and auxiliary buildings, power lines, telephone lines, and others would severely damage the natural environment. Excluding the paralleling roads, the canals alone would destroy an area of about 6,500 decares consisting, above all, of valuable timber totaling some 150,000 cubic meters. About 1 million cubic meters of rock will be extracted from the tunnels and its dumping will destroy the landscape.

The consequences of the drought which will take place after tapping the waters, once on elevation 2,000 and after that on elevation 1,500, will be even more lasting. The moisture-loving biocoenoses will be replaced by xerophytes. Erosion processes, already advanced as they are, will be intensified. That is why the commission believes that at best the water must be tapped in such a way as to remove only the surplus snow waters.

Could the area be effectively recultivated after the completion of the future construction?

Taking into consideration the experience acquired in the construction of the Belmeken-Sestrimo power system, where nothing has been recultivated as yet, it is believed that here the results will be the same. Such recultivation is very difficult and, most frequently, practically impossible. Previous experience has indicated that the humus is not scooped up and deposited in advance on specific areas but is lost among the big rocks. For this reason the development of a soil cover on areas disturbed following construction is difficult and expensive. The entire chapter six of the final report submitted by Energoproekt and the claim that a recultivation plan has been drafted are unrealistic. The fact that funds have been allocated does not mean in itself that there will be recultivation.

That is why the commission believes that after the construction ugly wounds will remain on the side of the mountain. It would take no less than 30 to 50 years before the cuts in the rocks made by the canals and roads would be concealed. Even a recultivation would not yield results in less than 20 years. Naturally, it is unquestionable that a recultivation could be possible at the Parangalitsa Reserve where, once disturbed, the biocoenoses can no longer be restored.

What would be the impact of the building of the Pastra Dam?

We cannot consider as generally valid the planners' claim that dams have a favorable impact on the climate and, in general, on the landscape. They have an adverse effect as well. In this case we cannot predict the impact of the high albedo of the water reflection on the convective movement of the air and, in general, on the energetics of the atmosphere in such a narrow valley as that of the Rilska River. It is unquestionable, however, that the dam lake will have a positive influence on the growth of forest ecological systems along the southern bank of the Rilska River. The commission draws serious attention to the danger of polluting the dam by the Rila Monastery, the highway which will pass along the dam, and other sources.

Are the Energoproekt hydrological estimates accurate?

They are puzzling, for they lead to the absurd conclusion that the water flow is either equal to or even bigger than the amount of precipitation. In the method used by Energoproekt the amount of the flow has been inflated, according to preliminary estimates, by no less than 16-27 percent. The commission could have concluded its report with this final point which offers sufficient grounds for a review of the entire project. However, this does not eliminate the validity of the other considerations. At the same time, it is a signal for reviewing the entire water resource balance of the republic.

In the final account what are the commission's recommendations?

The strictest possible observance of the status of the Parangalitsa Reserve and its buffer zone, preventing all construction work in the area, as stipulated in Article 16 of the Law on the Defense of Nature.

Following the completion of the tunnel the road leading to elevation 2,000 is to be closed. The necessary measures are to be taken for the immediate recultivation of the material taken out of the tunnel and of the existing roads.

The waters of Blagoevgradska Bistritsa have an exceptional impact on the ecological balance of the river's water basin subjected to the strong droughty influence of the Mediterranean. That is why the tapping of such waters in water collection derivations is undesirable.

The Energoproekt design must be reviewed in the part dealing with the collection of water from the Rilska River, the Pastra Dam, and the Rila Monastery Historical Reserve.

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BULGARIA

ACUTE WATER SHORTAGE ANTICIPATED BY YEAR 2000

Sofia ANTENI in Bulgarian 29 Jun 77 pp 1, 8-9

[Article by Nasko Mandadzhiev: "Concern for the Water"]

[Text] The transition between spring and summer this year was rainy. Perhaps that is why this may not be the proper time for discussing the question of water and the balance of water resources. True, the Iskur Dam is full and the water it releases goes exclusively to electric power production. Some power systems are working overtime to make use of the incoming water. We are also pleased to note that the "containers are filling up!" Let us hope that this will be the case every summer. However, along with abundance, we have seen a different situation: the way that same Iskur Dam, the biggest Bulgarian dam, was forced to lower its volume considerably, and the way in Dobrudzha and the Ludogorie area the water is allocated "by the hour."

During a year of average moisture in Bulgaria (72 billion cubic meters of precipitation) the water flowing in the rivers totals 19 billion cubic meters; in droughty weather, however, it drops to 9 billion. The disparity is alarming. The last 6 months were sufficiently humid. However, should the next few years turn out droughty, how would we resolve our water supply problem? How will this be accomplished in 20 or 30 years, when our needs will be several times higher?

According to the United Nations Committee on Water Problems, Bulgaria is in one of the last places in Europe in terms of the size of its surface flow (flowing surface water) per resident--2,265 cubic meters--compared with 2,500-5,900 or more cubic meters in the other European countries. Even though relatively poor in water resources, Bulgaria uses twice the volume of water compared with some well-supplied countries. Naturally, this increase is not the result of waste or poor management, but of objectively increasing needs for industry, irrigation, residential requirements, hygiene, and others. Compared with 1939 consumption has risen from 420 million to 8 billion cubic meters. In other words, before the war Bulgaria used as much water as is used today by our metallurgical plants (the Kremikoytsi Metallurgical Combine alone uses 110 million cubic meters of water per year).

The fact that we are poor in water resources does not mean that we have not been concerned with storing it. According to the classification of the International Commission on Big Dams our country has 452 big basins, not including the water reservoirs of agroindustrial combines, fishing ponds, natural lakes, and others. Most of our surface water has been tapped. However, this is not to say that it is managed efficiently. Should consumption continue to increase at the same pace and find us unprepared, toward the end of the century (and even earlier for some parts of the country) we would hardly be able to meet our requirements in the case of drought years. These are not groundless fears but a precisely calculated forecast.

Measures are being taken to resolve the problem. It seems to us, however, that they are insufficient. In our country water still is not considered a "commodity." It is not treated as an industrial product even though a large number of expensive systems are built for tapping and controlling it. Something else is no secret as well: some consumers use the "ready-made" water resources in our country quite shortsightedly and wastefully, relying on the "self-renovating natural forces."

Let us add to the sometimes inefficient management of water resources the alarming fact that river currents are being progressively polluted.

Thus, hydrologists have estimated that in some 20-25 years Bulgaria will be short 2.3 billion cubic meters of water in very droughty years. In some areas such a shortage may appear in moderately droughty years as well. What should be done to resolve the problem?

Are We Using the Danube River Sufficiently?

For the time being our country uses a small share--15-20 percent--of the maximal possibilities for the utilization of Danube waters. This circumstance calls for reviewing, supplementing, and modernizing all systems for increased utilization of the Danube River. New pumping stations and extensive water supply networks must be built.

Bulgarian and Soviet specialists are elaborating a comprehensive system for the water supply of northern Bulgaria. At present the water directly drawn from the river totals nearly 600 million cubic meters. After the year 2000 this volume should reach 3-5 billion cubic meters while the overall quantity of water taken from the Danube tributaries in northern Bulgaria should reach 10 billion cubic meters. This would satisfy completely the water needs of the area.

Pollution Without Treatment

According to the Committee for Environmental Protection at the end of May 1977 the country had 904 treatment stations. Of these 21 were inoperative while 33 percent of the others were not providing proper treatment. We could imagine how much polluted water reaches rivers and

dams passing through these inoperative or improperly operating stations! Do we know how many enterprises draw clean drinking water simply because they have no developed systems for reusing industrial water?

By the year 2000 our country must be ready to insure the treatment of no less than 2 billion cubic meters of water per year. Should we fail to accomplish this neither the Danube nor the dams nor subsoil waters would help us and the country's water resources plan would remain unbalanced.

Our treatment systems, paradoxical though it might seem, are operating improperly less because of shortcomings in their structure, maintenance, and operation than the obsolete and unchanged thinking of a number of economic managers who give last priority to environmental protection. This is the result of an imperfect system of incentives and penalties still operating in our country. Should an enterprise pollute the nearby water source a fine of 100 to 200 leva is levied on the director and chief engineer. However, such managers could not compensate periodical fines with their salaries, for which reason they find a way to compensate for the loss...Some of them have even managed a way to outsmart the situation: at the beginning of the year, along with their output they also plan for fines. They include the fines in a specific budget item and at the end of the year everything is straightened out with a few skillful jugglings of figures by the chief accountant.

The time has come to consider nonfulfilled the plans of enterprises which have polluted the environment.

What is Our View on Subsoil Waters?

Recently environmental protection people in Kazanluk described to us the drop in the level of wells near the Tundzha River which supply the city with drinking water. Quarry enterprises began to extract gravel from the river near the wells. They lowered the riverbed and, respectively, the level of subsoil waters. The well water dropped immediately afterwards.

This makes us think of the need to adopt a better organization and a scientific approach to the most special part of our national water sources--the subsoil water. We still have not determined the amount of their industrial stock. We have not determined the hydraulic interrelationship between surface and subsoil resources. We have a number of organizations dealing with water but we lack a definitive subsoil hydrological map showing such an interrelationship. Also lacking is a regulation on the protection of such water from agrotechnical chemical enterprises such as spraying, fertilizing, and others. Yet, this is particularly important, bearing in mind that such water is used mainly for drinking purposes.

Currently about 1.5 billion cubic meters of subsoil waters are being drawn out in the country. Toward the end of the century the amount is expected to reach 3 billion cubic meters. Possibly this figure as well could be exceeded providing that we have properly determined the subsoil, the invisible picture of our national water resource.

Other Possibilities...

A large percentage of the surface flow remains unused to this day. It is estimated that after completing the integral water resource system of the country it will become possible to use additionally over 2 billion cubic meters of water from the surface flow.

The possibility exists to transfer water from areas rich in water resources to areas with limited resources and higher consumption. Such redistribution could cover 2 billion cubic meters of water.

PAVETS [Pumping-Storage Hydroelectric Power Plant] are a promising type of water storage electric power plants which could absorb a large share of the production of electric power at peak hours, thus releasing water from processing through the hydroelectric power plants using dam waters.

Water "War"

Here is an example of wrong regulation of water resource management: the Iskur Dam, owned by the Dams and Power Systems Directorate of the Ministry of Power Supply, supplies water to the Pancharevo Dam owned by the Water Resources DSO [State Economic Trust] of the Ministry of Agriculture and Food Industry. From this dam the water is sent to the Kremikovtsi Metallurgical Combine, to the industrial zone of Gara Iskur, and to Sofia and used for drinking, irrigation, and so on. The directorate does not pay the Iskur Dam but charges its consumers. It also receives water from the Traycho Kostov TETs of the Ministry of Power Supply which shortly before that had offered it free of charge the water of its dam.

Such curious situations exist as a result of the large number of owners of our water and the undetermined relations among them. Drinking water is owned by the Water Supply Economic Enterprise which does not purchase the water but which sells it. The Water Resources DSO of the Ministry of Agriculture and Food Industry is responsible for irrigation waters. The Ministry of Power Supply is responsible for water used to generate power. The Committee for Architecture and Urbanization is in charge of drinking waters. The Ministry of Forests and Forest Industry is in charge of fish-breeding farms. Since the dams--the main water sources--supply water most frequently to meet comprehensive requirements--drinking, irrigation, power production, and other industries--the knot here becomes tangled and cannot be loosened: who invested funds for the water source, who is using it, who is maintaining it, who is charging money for the water and where does this money go, who has a plan for water extraction and how is this plan being fulfilled?...Even water resource officials with long experience find it difficult to find their way in such administrative labyrinths.

Here is an example of the way the state loses both water and funds as a result of unspecified regulations and financial conditions: charges per 100 cubic meters of water from a dam are as follows: 0.15 leva for

irrigation, and from 0.40 to 2.29 leva for industrial needs. It is easy to understand that if such payments are made to the owner it would be in his interest to give water primarily to enterprises, thus fulfilling his financial plan. Since such enterprises have priority compared with irrigation (they could always rely on the dam) they do not bother to build recirculation systems. This is largely the reason for the following balance: in the last 5 months the Water Resources DSO was paid 2.4 million leva for 2 billion cubic meters of water taken for irrigation and 3.6 million leva for 300 million cubic meters for industrial uses. On the other hand, that same trust has its so-called "irrigation plan," i.e., it must provide a certain quantity of water if it is to earn bonuses. Without accusing the trust of unconscientiousness, let us note that if at a given moment it does not have water customers what would prevent it from draining the water into the Danube River or the Aegean Sea?

If our water is managed by a single organization with a single financial-economic plan and comprehensive responsibility in terms of this natural resource the labyrinths may be straightened out. In countries such as Czechoslovakia, for example, such a unification has reached a nearly maximal extent. In our country we have a single owner of the soil and dozens of the water.

The centralization of water resource activities will eliminate misunderstandings among consumers. Here is yet another example of this nature: nine dams in the country supply water for power production in the nonirrigation season (since there are no equalizers for secondary control) at 1-1.5 billion cubic meters of water per year. After all this how could friendly relations exist between power and irrigation workers?

Uncoordinated Norms

Our country has no standard prices and rates for water charges. Charges per 100 cubic meters of water for irrigation and industrial needs are 0.55 leva in Sofia, 1.25 leva in Sofia Okrug, 2.29 leva in Vidin, and 2.12 leva in Gabrovo. Plovdiv and Stara Zagora have "settled the matter" reciprocally by paying only 0.40 leva.

The same situation prevails with drinking water. In Kyustendil and Pazardzhik, for example, it costs 0.03 leva whereas in Razgrad it costs 0.06 leva, and so on.

Standardizing the price of water would play a useful role. It would be equally useful to establish the types of norms which would prevent waste and encourage thrift. The industrial enterprises above all should learn sensible management by meeting certain requirements concerning the amount of water used per unit of output, the required recirculation of water, the search for and use of dry technology in some production facilities, and so on. For example, 800 tons of drinking water are used in producing 1 ton of steel. However, should the production system be disturbed and should water consumption per ton be raised compared with a new norm the result should be considered an economic violation.

What about us, citizens, do we save valuable clean water? In some yards the taps keep running and watering tomatoes and cucumbers. In many houses unsealed pipes, taps, and containers are leaking. In some water reservoirs faulty blocking systems (such as that at the Ivaylovgrad Dam) let thousands and millions of cubic meters leak out. The life-bringing water is running along the canals of many irrigation fields while no spraying workers are to be found at night or during preholidays and holidays. In many areas irrigation canals are not properly sealed and the water drains through cracks in the tiles. Gravity irrigation is still preferred to spraying but thousands of cubic meters of water go to the rivers unused, and so on, and so forth. These reasons account for a loss of about 25 percent of the resources. All in all the amount of water supplied in the country exceeds the amount of water consumed by 35 to 40 percent. Every year almost 300 million cubic meters of water are wasted, approximately the volume of the G. Dimitrov Dam. Such an amount of water could irrigate about 700 thousand to 800 thousand decares of land, i.e., 3 times the size of the Eastern Sofia Plain.

This problem affects all of us. Pure water is both a governmental and a personal problem, as important as it is to have several glasses of clean drinking water every day.

5003

CSO: 5000

CZECHOSLOVAKIA

CZECHOSLOVAK WATER MANAGEMENT DISCUSSED

Prague RUDE PRAVO in Czech 4 Jul 77 p 3

[Article by Lumir Hrudka: "A Problem Called Water"]

[Text] The waters of the Vltava flowed over the weir and their murmur carried through the open window into the office. A suitable environment for people whose activity involves the watery element. The Prague engineering enterprise Water Management Development and Construction is known as an investor in all dams; it also takes part in the construction of other significant water management construction projects, from the water treatment and purifying plants to making streams navigable. It solves and untangles the problem called water.

In a comfortable office with a view of the river we chat with Engineer Jan Schwarzer, manager of the enterprise. Slim, or rather thin, with unruly whitish hair. He speaks quietly, though absorbedly, with the knowledge which he has stored up during a quarter century of service in water management.

Probably everywhere in the world people worry about good drinking water. According to the data of the World Health Organization, more than 1 billion people suffer from insufficiency of good quality water. The statistical curve demonstrating the need for the life-giving fluid is also quickly rising in our country as a result of explosive technological development and of the style of living. Soon it will reach an amount of about 10 billion cubic meters per year.

"I learned still in school that a sufficient supply of water is 100 liters per person per day," says Engineer Schwarzer. "At present we are planning a quadruple amount for each inhabitant. Accordingly we are also planning dams, reservoirs, treatment plants, and further projects--construction projects which serve the production of power, supply good-quality water, and likewise improve natural conditions. Lakes created by dams are normally also part of recreation."

Construction projects of the Fifth Five-Year Plan were to primarily assure sources of drinking water. Large communal water systems got priority. The Prague regional water supply with a dam on the Zelivka--which is being further expanded--will supply 700 towns and obeces. The Prisecnice system assures water to the inhabitants and enterprises of the Chomutov and Most area.

We look over photographs and drawings. We look into the future. Water reservoirs, treatment plants, water systems. At the end of this five-year plan, water flow from public water systems to about two-thirds of our citizens. We shall build new sources of drinking water for the regions of Liberec, Klatovy, Domaxlice, Olomouc and elsewhere. The Rimov waterworks will supply a large region of southern Bohemia with good water.

To disentangle the problem called water is not easy or cheap. The majority of the large works initiated in this five-year plan will begin to serve only after 1980. During the five years the Ministry of Forestry and Water Management of the CSR and the national committees will spend more than Kcs 14 billion on water management development.

"The sixth session of the Central Committee of the CPCZ dealing with construction emphasized the key role of the investor. That is where decisions about investment begin, and the project and the quality of the work are judged; where the finished work is delivered and brought into operation. Every construction project," notes Engineer Schwarzer, "is the child of an investor, of a designer, of builders and suppliers of equipment, a common enterprise, and thus all must pull on one rope. We have created conditions for the investing activity to be carried out as a specific profession in the socialist division of labor. We understand our responsibility in terms of an entire construction project from the beginning to the end, to the time when reliable operation begins."

Last year, the CSR recorded the largest extent of water management construction to date. The engineering enterprise, jointly with the partners Hydroprojekt, Vodni stavby [Water Construction] with workers of Ingstav Brno, CKD [Ceskomoravska-Kolben-Danek, national enterprise (heavy machinery)] at Blansko, Sigma Hranice and other enterprises saw above all to the completion of the construction projects as a whole and without remainder.

"We understand our activity also as a political mission," adds another specialist, Engineer Jan Vytrisal who is the chairman of the committee of the basic organization of the CPCZ. "The Slusovice reservoir of drinking water and the Svitavy purification plant of sewage waters began to function before the deadline, water flowed from the Prisecnice system 3 months earlier and so on. The success of capital construction depends on many circumstances. It is a continuing struggle for the fulfillment of the plan, for the new and the more perfect, for the overcoming of ingrained bad habits, sometimes even of indolence. Our people do not sit in the quiet of the office, but partake in managing right on the construction sites."

Whoever wants to work well must know a lot. They also are insisting on this principle in enterprise. The party organization has sponsored further studies for the technicians. Chairman Engineer Vytrisal has just finished his minimum requirements for the candidate's degree. Discussions and seminars make it possible to obtain the most recent information about water construction. Almost half of the workers have obtained higher education, a third graduated from industrial schools.

Investments which support the development of energy sources likewise characterize the Sixth Five-Year Plan. Not long ago, a navigation route was opened on the Elbe to Chvaletice to the new power plant. Already plans are being made for expanding the Elbe route to a second power subdivision in eastern Bohemia. In 3 or 4 years ships with freight of almost 4 million tons of coal annually will sail on the Elbe, in the future perhaps twice the amount. The output of coal is growing in the north of Bohemia. Here also water managers will intervene. They will transfer the interfering river Bilina into a new artificial channel; they will also build a new water reservoir and water distribution network. For the best preparation of large investment projects, the enterprise creates with its partners intraenterprise complex rationalization brigades.

A view of the manager Engineer J. Schwarzer: "Effective cooperation with our partners--and there are among them also Polish firms that build weirs and other works on the Elbe--is a necessity. Together we are searching for reserves and possibilities for technical improvement and economy. Combined socialist pledges have proved to be successful not only for a part but also for finishing the entire project in the designated time up until starting operation. We have attained certain successes, but this does not mean that we do not have shortcomings, that we have nothing to improve."

The problem of water has not disappeared; it is only changing according to the needs of society. The collective of Water Management Development and Construction, which was not too long ago awarded the Order of Work, serves water. And water serves us all.

9105

CSO: 5000

POLLUTION PREVENTION IN STEEL INDUSTRIES

Teheran TEHRAN JOURNAL in English 11 Jul 77 p 3

[Text]

TEHRAN — All steel industries are being required to apply filters to their smelters and other machinery to prevent pollution of the environment, it was announced here yesterday.

Mohammad Reza Amir, managing director of the Pahlavi Steel Mill Complex in Alvaz told newsmen yesterday that the purchase and installations of the filters could cost an additional \$15 million. But, he added, the expenditure was worth it in the interests of public safety.

This system, he said, will prevent the pollution of air particularly by steel mills using a direct smelting system.

Referring to the decentralization program of the National Iranian Steel Mill Co. Amir said at present about 4,500 employees were working with his mill of which only 83 were foreign nationals.

Under the policy of the National company, Amir said, all the preliminary work for the Isfahan and Bandar Abbas Direct Smelting steel mills were concentrated at the Pahlavi Complex.

This, he said, prevented an

unnecessary expansion of the organization in Tehran. Besides, each of these units were able to meet all their requirements locally.

In building the Pahlavi Complex, he said, an effort had been made to utilize Iranian services as far as possible. But assistance also came from American, West German, British, Italian, French, Austrian and Mexican firms.

So far, he said a number of agreements have been signed with local and foreign companies for the completion of the complex. He added more agreements will be signed as the work progressed.

CSO: 5000

ADMINISTRATIVE ASPECTS OF ENVIRONMENTAL AGENCY EXAMINED

Copenhagen BERLINGSKE TIDENDE in Danish 28 Jun 77 p 18

[Article by Carl Hansen]

[Text] It isn't even 10 years since real pollution control was put into effect in Denmark. The danger signals and incipient uneasiness among the people led to the government in power in 1969 appointing a pollution council. Its task was primarily to map out pollution situations but it also made various proposals for intervention which were carried out by the different ministries then sharing responsibility for environmental issues.

Streamlined Organization

An independent ministry for the control of pollution was formed in 1971 with Jens Kampmann as minister. A half year later the Environmental Board was set up, now in its fifth year. The new ministry was given supervisory powers over food products and chemicals but its efforts were more a technical control of existing pollution rather than a preventive activity.

In the fall of 1973 a real Ministry of the Environment was created which took over related issues from other ministries and unified legislation and administration of the concrete problem of pollution control along with physical planning (from the Housing Ministry) and administration of natural resources (from the Cultural Ministry). The environmental law that went into effect at the end of 1974 formed the basis for activity and the law is to be taken up for re-evaluation to a greater or lesser extent during this parliamentary year. In that context it is worthwhile examining the apparatus with which the law functions.

The ministry and the Environmental Board are administratively unique in some ways. Because they were new creations it was possible to ignore a lot of departmental tradition and construct streamlined organization. One with a staff that was less bureaucratic, worked more across lines of competence and was fresher than those in other state bodies. From the

start the average age of personnel was 34, the age of Jens Kampmann at the time incidentally, and department head Holger Lavesen was one of the oldest at 36. The composition of the staff also had to be somewhat unusual because environment is such a comprehensive area. The ministry and the board employ lawyers, economists, engineers, biologists, doctors, academicians and naval commanders to mention a few specialties.

To a large extent decisions are made by ordinary staff members and of course that has helped create a good internal working environment. Externally emphasis has been placed on an openness unknown to public administration. Legislation and administration based to a large extent on prohibitions and restrictions can easily create irritation but the information released to the public has undoubtedly helped create understanding of environmental issues.

Five Fingers

In addition to the department, the Environmental Ministry consists of five boards with a wide degree of autonomy in relation to the ministry. The boards gather information, prepare laws, prepare guidelines and take up individual matters within their respective spheres.

To a large extent it is up to the towns and counties to exercise the laws and regulations for their parts of the country and permits or bans are also issued locally, including supervision as to the effectiveness of these decisions. But many individual matters ranging from the keeping of domestic animals to comprehensive town planning end up with the boards which besides being advisory also act as courts of appeal. The five boards are:

The Environmental Board whose task broadly expressed is to protect people, animals and nature in general against pollution and noise. The board has at its disposal three laboratories and special preparations for handling spills of oil (as in the Ekofisk field in the North Sea) and chemicals as well as the supervision of atomic plants.

The Environmental Board holds a central position in relation to business because it is the one that in the last resort determines whether a firm is acting legally or if production presents a nuisance and a danger to the surroundings that is important enough to require a ban, as was the case with the planned PVC factory at Stigsnaes.

The Environmental Credit Council which grants state aid to older firms that must make changes to meet the requirements of the law has a secretariat with the board. Normally the decisions of the Environmental Board cannot be reversed even by the minister but some cases can be appealed by those directly concerned to the special Environmental Appeals Board, where

the business world but not consumer organizations for example is represented on the bench.

The Planning Board is probably the finger on the ministry's hand that is best equipped to forestall conflicts of interest by planning to prevent the location of such incompatible elements as an airport and a housing complex in close proximity to each other. In plain language the Planning Board is concerned with how to use the nation's space.

The guidelines are drawn up in the laws on town and country zoning, national and regional planning and municipal planning. These determine where town development will occur, which land is suitable for business purposes and where summer houses and other free-time interests can be located, etc. These laws are written so that citizens in the areas affected are insured an influential role based on knowledge of the plans. And if the inhabitants feel that local politicians are ignoring their wishes they can complain to the Planning Board.

The most prestigious task of the Conservation Board is to preserve valuable natural areas and buildings of cultural and historical importance. The administration of the natural conservation law is handled by the board. But it also has an increasingly heavy responsibility for keeping track of the diminishing supplies of raw materials such as gravel, clay and lime. Thus we find under the Conservation Board the Danish Geological Survey which is mapping out in detail how large our remaining reserves of natural resources, including ground water, are. A new raw materials law is underway in parliament.

The Forestry Board's sphere of interest is apparent from its name. In addition to managing the national forests (a scant 4 percent of Danish land) and protected areas so they can meet recreational needs without being overused, the board is a sort of business. The Forestry Board gets a lot of income from the sale of trees and of evergreen branches at Christmas.

Finally, the State Food Institute comes under the Environmental Ministry. The Institute is responsible for making sure that our food products and the like do not pose a health hazard. The task is a difficult one because new production methods and food product sales practices in recent years have introduced many artificial additives, primarily intended to extend the shelf life of products as well as to give them a more attractive appearance. Each year the State Food Institute prepares a so-called positive list. Only substances on this list in precisely stated quantities may be included in food products.

One can ask whether Denmark has become a cleaner and healthier country since the environmental law went into effect 3 years ago and the boards

mentioned above began their activities. One can point to measurable progress, for example with regard to watercourses where good purification plants have been set up. But development has also progressed and with it fresh sources of pollution. More generally, therefore, one would have to be content to note that without the environmental effort Denmark today would have been a poorer country to live in and that a more effective effort would have given greater results.

The fact is that both the unfortunate effects of man's enterprise and the efforts to combat pollution do not show up in many cases before many years have gone by. Poison sprays and artificial fertilizer spread out over the fields yesterday will not reach the ground water we use for drinking for many years.

Furthermore, protection of the environment is not just a Danish problem. Sulfur in Danish streams has turned out to originate in the West German Ruhr district. And lead that came down with the rain on the fields of Langeland turned out to have come on the west wind from industries in England.

But we must clean up our own yard in order to ask others to clean up theirs.

6578

CSO: 5000

DENMARK

NEW LAW TO PROHIBIT WASTE, PROMOTE RECYCLING OF PRODUCTS

Copenhagen BERLINGSKE TIDENDE in Danish 23 Jun 77 p 1

[Article by Carl Hansen]

[Text] The Environmental Board is preparing a bill that would make it possible to require recycling in some production. This would be a law that would deeply affect consumer habits as well as production conditions in certain businesses.

The main idea of the bill which Environmental Minister Niels Matthiassen is expected to bring up in the fall is to reduce consumption of raw materials, including energy, involved in the production of certain goods and to reduce waste problems.

The law will probably be an authorizing act making it possible to prohibit by proclamation at any time the manufacture of certain products or to impose special regulations concerning their composition and possible recycling.

The Environmental Board proposal will contain regulations calling for certain products to contain a certain percentage of reprocessed materials, it will require the use of certain materials or products and prohibit the use of others depending on their capacity to be recycled, it will provide for the introduction of mortgage and excise tax arrangements to promote recycling and it will give communities the power to set up the collection of materials for recycling.

As examples of how the law can be used, we might mention paper and cardboard. Here one could prohibit the use of certain printing dyes that are hard to remove and require that new paper and new cardboard should include recycled paper products.

Society's big consumers of packaging material are sure to be a target. Cardboard milk cartons will probably be replaced by plastic containers.

And finally the aesthetic disadvantages of the many automobile graveyards could also be removed little by little as part of the implementation of the recycling authorization law.

6578

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DENMARK

FRAMEWORK, SHORTCOMINGS IN IMPLEMENTING ENVIRONMENTAL LAW REVIEWED

Copenhagen BERLINGSKE TIDENDE in Danish 27 Jun 77 p 12

[Article by Carl Hagen]

[Text] "Get your hair set in a salon -- Wisp Salon, the best environment for your hair." "He went to the bottom in the drug environment...." "Envirocrax -- the cracker that doesn't leave crumbs." Environment has become a fad word. We use it in relation to job sites and housing complexes and the concept is used as a designation of quality for growth conditions and our circle of acquaintances. To sum things up, used in this sense environment can be said to be a prerequisite for living.

There is a law aimed at protecting such fundamental conditions for life as clean air, potable water and the natural environment in general that provides us with food and experience. The "Environmental Protection Law" which Queen Margrethe proclaimed almost exactly 4 years ago went into effect on October 1974.

Divided Opinions

According to the last paragraph of the law, it is up for review in the current parliamentary year. Environmental Minister Niels Matthiassen declared recently however that he would like to have a more thorough review postponed for 3 years and if it were up to him there would only be a few though important changes this year in the current law. Niels Matthiassen said: "There is broad agreement that the regulations of the environmental law are good enough by and large. There is a positive attitude toward the law on the part of municipalities, counties, industry and agriculture. The same is true of other groups working on environmental issues. They feel positive about the many new regulations, guidelines, etc."

But the view of the environmental minister is not shared by all "other groups." Among the outspoken advocates of environmental protection is the Noah organization whose name similarity with a well-known person in

the Bible is no coincidence. Noah spokesmen say: "The environmental law is a framework law whose beautiful goals are not put into practice. The experiences of the last 3 years have shown us that."

Considering the importance of the issue -- it is the one law that affects all of us the most -- one might expect a thorough debate on how comprehensive the proposed changes should be. For while the spring compromise, for example, was simply a question of making small adjustments in the distribution of benefits the protection of the environment is really a question of ensuring that there will continue to be benefits to share.

Results of Growth

Environmental resources exist but this isn't just a question of bird song and beautiful views. It is only a few years since we were shaking our heads over scientists and others with special insight whose warnings about pollution and wasting raw materials were regarded as unrealistic doomsday prophecies. Poison catastrophes in other lands, inexplicable illnesses, energy crises, the ban on North Sea fishing are all examples indicating that there was something to those warnings.

It was in the 1960's that industrial growth tempo peaked. We, the richest part of the world, created what has been called the welfare state with a previously unheard of wealth of material benefits. The use-it-and-throw-it-out mentality was fashionable because it was generally accepted that there was plenty to take from and the important thing was to consume as much as possible to keep the wheels turning. The scarcity and large price increases on oil, the driving force of our technicalized society came as a shock and all at once slowed the tempo of the wheels. Oil was the most important but not the only raw material that became scarce in the early 1970's. In this country we can detect the bottom of the deposits of gravel and clay that are the backbone of the construction industry.

Along with the scarcities the unfortunate effects of rapid activity covering an ever-increasing area were about to reveal themselves in the form of pollution. This affected animals, plants and people. It is estimated that industry today uses at least 10,000 chemical substances and the number is increasing sharply. Limits have been set as to which of these substances can be used and in what quantities in the case of some of them. But with regard to many of them we do not know the long-range effects -- on people and the environment -- because the substances are untested and because the consequences of the daily dosage may not show up for decades.

Certain frightening examples are known. In Japan thousands of people were affected a few years ago by a previously unknown sickness that was called "Itai-tai." One of its symptoms was bone deterioration. The Japanese had eaten rice irrigated with flood water polluted with cadmium -- a substance used in connection with enameling.

Stigsnaes Issue

The most relevant example is probably the poison catastrophe last summer in the northern Italian town of Seveso where an entire district was laid waste by the factory emission of the manmade substance dioxin. The poison causes liver damage and cancer among other things and can damage unborn fetuses.

Dioxin is not produced in Denmark but we may be getting a factory for the production of the plastic substance PVC. The raw material involved is vinyl chloride gas which can also cause cancer. PVC is used to make such diverse things as water pipes, bottles and foil for packaging food products. There are many proofs of the dangers of vinyl chloride gas which can cause cancer of the liver among other things. Most vulnerable of course are the people working with the substance but those living in the neighborhood of a factory have reason to feel insecure about the inevitable emission of vinyl chloride in the air.

The plans are to build Denmark's first PVC factory at Stigsnaes near Skaelskor, using Norwegian and Swedish capital and producing close to 100,000 tons annually or roughly twice the Danish consumption level. The district medical officer and a large number of area inhabitants have protested such a factory because of the health hazard and the Environmental Board is currently considering whether the West Sjaelland County preliminary approval of the project should be reversed. The issue which has been called "the biggest issue in our pollution history," has been discussed in the parliamentary Environmental Committee which feels that the minister should be asked to halt the plans. The factory would provide a good 100 new jobs but it must be expected that others would lose their jobs because a nearby orchard could hardly go on being operated due to vinylchloride emission.

Duplicity

The Stigsnaes case is an example of the difference between purely environmental considerations and economic interests which is also expressed in the environmental law. Its first paragraph states that the law is to be used in particular to try to insure qualities in the external environment that are of importance for man's hygienic and recreational living conditions and for the preservation of a well-rounded animal and plant life. But it also says that in considering an approval weight should also be placed on the "social utility of the activity in question and the costs of protective measures."

The skeptics among the environmentalists feel that this duplicity in the declared aims of the law is widely administered in favor of narrow economic interests. The opposite side points out that everything has a price and that a more restrictive policy would mean more expensive goods

and reduced employment. Helge Odel, who is now department head in the Ministry of Internal Affairs, said just before he was replaced as director of the Environmental Board by Ejler Koch: "We must take care of our environment in such a way as to prevent catastrophes from happening while at the same time permitting a natural development to occur. Denmark should not be a reserve where every form of business development is halted. There will still be room for airports, roads and industry. We are performing a balancing act. One can always discuss whether environmental factors are playing the role they should but the worst enemies of the environmental issue are those whose demands are unreasonable. Their exaggerations create irritation and erode the good will I believe exists among the people with regard to the environmental issue."

Another controversial regulation is found in paragraph 44 of the law. This says that firms that have once been given approval cannot have new bans forced upon them unless the pollution substantially exceeds that on which the initial approval was based. This means that it would be hard to carry out regulations based on such things as new research results indicating the need for stricter limits than were once thought necessary.

The changes Niels Matthiassen wants to propose in the law concern authority -- and distribution of costs -- involved in waste water systems coming under public boards as well as industrial conditions. If construction of a new factory is involved, for example, the construction would not have to wait as it does now for the final approval of production conditions. The other change of interest to industry -- and to everyone, for that matter -- concerns limiting the right of firms to use the claim of manufacturing secrecy to conceal information from state authorities as to which substances they are working with.

The latest phase to date in legislation intended to insure our survival is a recycling law that will probably be presented to parliament in the fall. With its help the environmental minister will be empowered to force production and consumption into less resource-demanding and polluting channels.

6578

CSO: 5000

DENMARK

PROTECTION OF WETLANDS PRESERVES ECOLOGY BEYOND BORDERS

Copenhagen BERLINGSKE TIDENDE in Danish 27 Jun part I p 2

[Article by Palle Tornqvist]

[Text] The tidal area which is Denmark's most valuable wetlands area is not on the list of wetlands Denmark has promised to protect under an international convention that has just been ratified.

That is due to the Danish-West German cooperation on the construction of an extruding dike from Emmerlev to the Hindenburg embankment. The dike will affect about 1100 hectares of valuable bird areas but it will be possible to create new nature preserves between the new dike and the existing one.

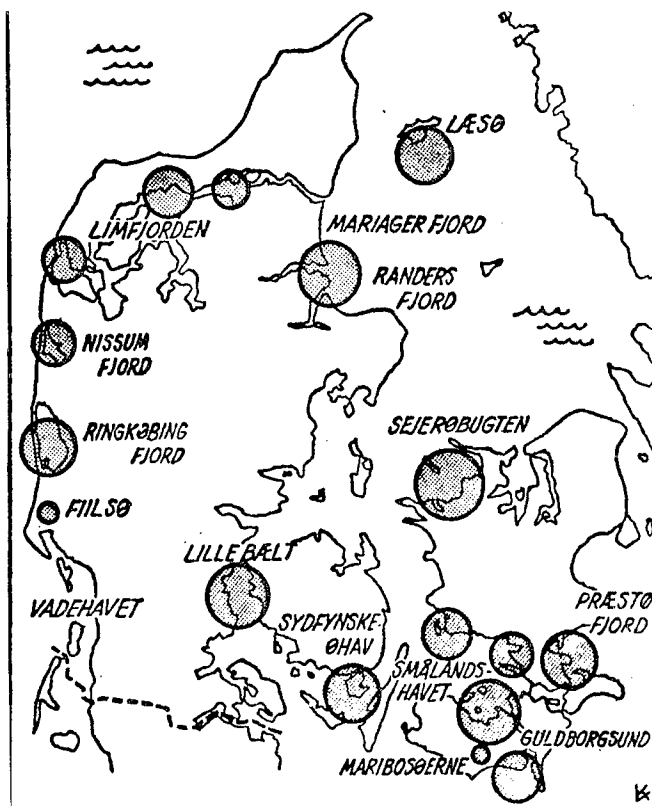
When negotiations on the final location of the extended dike are concluded the tidal area or parts of it can be included on the list of protected areas, according to Environmental Minister Niels Matthiassen in a statement to the parliamentary committee on physical planning.

Obligations

Danish ratification was expedited by the government because Denmark owns a number of the most valuable wetlands in Europe. Both in the nesting season and in the migrating season, a very large share of European water birds can be found here.

The convention which was worked out in Ramsar, Iran, in 1971, means that Denmark assumes a number of obligations with regard to the other signers:

Wetlands areas, listed separately, are to be managed in an ecologically responsible manner. Areas can be deleted from the list or reduced in size "only if urgent national interests make this necessary." And the convention recommends that in such a case a country should balance the loss as much as possible by protecting other living areas for water birds in accordance with the convention.



Denmark consists of some of the most important wetland areas in Europe and this imposes special obligations with regard to ecology and bird life.

In general the convention requires its signers to plan land use so that wetlands areas are "used sensibly." The parties to the convention must notify each other if changes occur or are anticipated in the ecology of the wetlands areas due to technical developments.

In the future Denmark will take part in conferences on wetlands and the convention also calls for ongoing consultations among nations.

Mostly Coastal Areas

The 25 protected areas on the Danish list do not include all the locations that must be regarded as internationally valuable but only the most important ones, Environmental Minister Niels Matthiassen told the parliamentary committee on physical planning. Only two of them are inland.

They are the dry Fiil Lake in Ribe County and the Maribo lakes in Storstrom County.

The other protected areas are located mainly along the west coast of Jutland, in Limfjord, around the Little Belt, the South Funen archipelago, Sejro Bay, large parts of the waters off Smaland along with Fejo and Femo, Nakskov Fjord and the waters north of Mon.

To administer the conservation of these large water areas, the Conservation Board will appoint a cooperative group representing a number of ministries. One of the tasks of the group will be to keep the list of protected areas up to date.

The Danish ratification of the Ramsar convention will not lead to any expenses or administrative expansion. That is why the question of ratification has not been presented to parliament.

6578

CSO: 5000

DENMARK

ATMOSPHERIC POLLUTION INCREASES RISKS FOR NEW ICE AGE

Copenhagen BERLINGSKE TIDENDE in Danish 22 Jun 77 part 2 p 1

[Interview with Professor Willi Dansgaard of the Geophysical Isotope Laboratory at the University of Copenhagen; date and author not given]

[Text] The last 5000 years have been increasingly cold and we cannot exclude the possibility that we are on our way into a new ice age, according to Professor Willi Dansgaard, Ph.D. But man's pollution of the atmosphere is another great danger threatening the climatic balance. Burning fossil fuels has substantially increased the carbon dioxide content of the atmosphere.

[Question] One day we hear that mankind will freeze to death -- the next that we will all fry up. But what is the truth? Is it at all possible to predict what the weather will be like in future years, not to mention future centuries?

[Answer] No, it isn't -- at least not yet, was the reply of Professor Willi Dansgaard, Ph.D., of the Geophysical Isotope Laboratory at the University of Copenhagen.

(In order to study climate developments in Greenland he has measured isotopes in a 1400-meter long ice core from the inland ice cap. Part of it exists today in the basement of the Institute in the Norrebro section of Copenhagen. Now he along with American colleagues is planning a new boring within the next few years. It will go down to the bottom of the inland ice cap where it is thickest -- 3.2 kilometers.)

This drill core can tell us how the climate has developed not just in Greenland but also in Europe, Professor Dansgaard said. The first prerequisite for being able to predict how the climate will develop in the future is to understand the development that has already taken place.

[Question] Are we heading into a new ice age?

[Answer] We can't rule that out. As I wrote recently in NATURENS VERDEN the problem is worth investigating because the ice age was by far the biggest natural catastrophe within the last 10,000 years.

But the fact that the last ice age ended exactly 10,000 years ago and that the climate has gradually been getting colder over the last 5000 years should not lead us to the panic conclusion that the next ice age is just around the corner.

In measuring the isotopes of the ice core from Camp Century in Greenland we believe we have determined the greatest temperature variations through the last 120,000 years. But other investigations go even farther back.

Within the last 900,000 years there seem to have been at least eight ice ages. In other words, there was one about every 100,000 years. If we look at the last warm period, the so-called Eem, the actual warm period probably lasted only about 10,000 years but it seems to have been followed by 30,000 years of a climate that was not catastrophically colder than it is today. If our own interval between ice ages continues to resemble the Eem Age we can expect that the climate will gradually stabilize for a very long time at a somewhat colder but otherwise acceptable level.

But one must not regard that as a prediction of the climate, for pollution of the atmosphere can mean that direct comparisons with the past will be misleading. Pollution constitutes an entirely different danger to the climate, one that may become as large in the next few centuries as the risk of a new ice age. The so-called greenhouse effect will play a part in this.

[Question] What does that mean?

[Answer] The shortwave part of the solar rays pass virtually unchecked through the glass of a greenhouse and warm up the soil and the plants, but the heat waves cannot escape back through the glass because they have a different makeup. That is one reason for the high temperatures in a greenhouse. Another and more important reason is that the wind is unable to blow the warm air away.

Carbon dioxide and vapor in the atmosphere work the same way as the glass in a greenhouse. The substances absorb some of the heat radiation from the earth's surface and thus contribute to insulating the atmosphere against heat loss into space. The insulation and the temperature along with it, at least at first, will rise if the content of carbon dioxide and vapor increases.

The burning of fossil fuels such as coal, oil and gas has now reached such a level that the concentration of carbon dioxide in the atmosphere has increased perceptibly. At the moment the rise is 0.3 percent each year -- and the tempo is picking up. The best estimates to date show that if we include the heat rise of 0.3 degrees that has already occurred fuel combustion will cause a rise in the average atmospheric temperature of between 0.6 and 1.2 degrees in 50 years, depending among other things on how well we manage to restrict the increased use of fossil fuels.

The heat rise would be considerably more than 1.2 degrees if it weren't for the higher vapor content in the atmosphere giving more cloud cover and thus increasing reflection.

These figures may not sound too alarming, but they must be compared to the changes nature itself has made in the atmosphere in the past. Under the climatically most favorable conditions 4-7000 years ago the average temperature of the atmosphere is estimated to have been 1 degree higher than it is today. During the so-called "little ice age" 3000 years ago it is estimated to have been 1 degree lower.

Thus the burning of fossil fuels could, due to the greenhouse effect, very easily give the climatic balance a bigger "shove" than nature itself has been able to provide since the ice age. And there is enough fuel available to give a "shove" 10 times larger than what we have calculated here for the next 50 years.

[Question] What would be the consequences of such a shove?

[Answer] We don't know for sure. It is possible that with our climate models we will be able to solve the problem. But it is obvious that such a development would represent an element of risk simply because any change in the climate belt means a change in food production and the social structure, but also because temperature increases are not evenly distributed over the earth's surface.

For each degree of heat rise in the atmosphere as a whole, the temperature will rise a half degree in the subtropical zones but as much as 2 degrees at 60 degrees north and no less than 3 degrees at the 75th northern parallel. Since it is temperature differences that produce low-pressure activity along the polar front, we can fear declining amounts of rainfall in the temperate zones.

[Question] Is it possible to predict anything at all about climate developments?

[Answer] Not with the climate models we have today. Even the fastest computer would be 100 times too slow to solve the problem in a reasonable

length of time. If we can make an effective climate model then it should be possible to predict developments at least a few decades into the future.

The only possibility we have is to base the model on known situations in the past and have it "predict" the known changes that occurred thereafter. That is why the study of climatic variations in the past is not merely of academic interest but a study serving a practical purpose as well.

[Question] Where will the drilling to the bottom of the inland ice cap be done?

[Answer] That is what we have to find out now. We are going to Greenland in the summer and we will drill 500 meters down with a new type of drill. The big drilling operation in 2 or 3 years will probably occur at the geographic center of Greenland.

It is the Americans who will perform the big drilling operation. The Danish contribution will consist of taking sonar soundings and drawing the topographical map of the surface and bottom of the inland ice cap, led by Professor Preben Gudmandsen from the Danish Technical College, and studies of the ice core. Switzerland is also participating in the project which will cost the United States about 6 million dollars over the next 5 years, while Denmark's contribution will probably be around that many kroner.

With these studies we hope to be able to discover how ice ages begin. We also hope to find out if the climate can change suddenly from hot to extreme cold, which the Camp Century curve suggests happened about 90,000 and 115,000 years ago without leading to any extended ice age.

If a new deep ice core shows the same characteristics, perhaps dust studies and chemical analyses will be able to provide an explanation of these now incomprehensible events.

Thirdly, a precisely dated core that covers the entire period since the ice age could provide all the essential details about climate and volcanic activity in our own climatic period. Finally we hope that radioactive isotopes can provide information about the variations of cosmic rays hundreds of thousands of years ago.

The inland ice cap still contains the answer to many questions.

Biographical Data

Willi Dansgaard, graduated from Efterslaegtselskabets School in 1941, physics degree 1947. Received the University of Copenhagen Gold Medal.

Scientific assistant at the Meteorological Institute. Assistant professor at University of Copenhagen 1951, associate professor 1960, professor of mass spectrometry 1962. Research associate at Chicago and Northwestern University 1954-55. Various expeditions to Greenland, leader of glaciological expedition to Norway 1962, Ph.D. 1961. Among other honors, recipient of the Royal Geographic Society's Hans Egede Medal and the Swedish Geographic Society's Vega Medal.

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GREECE

INCREASED NEWBORN DEFORMITIES LAID TO ELEVSIS POLLUTION

Athens I VRADYNI in Greek 25 Jun 77 p 5

[Article by Dim. Belsis]

[Text] Births of deformed babies have been on the increase in Elevis in recent years, and the most probable cause of this is the frightful pollution of the environment!

The city's mayor, Mikhalis Levendis, made this sober revelation yesterday at the city's cinema house, within the framework of the report he gave on the decisions of the municipality for 1976.

The gynecologist Sasandis came to the above finding about deformed births after years of research.

Mr Levendis, in referring to the "number one" problem of the city--the pollution of the environment--stressed that the "Khalyvourgiki" [steel works] has received a permit to expand its facilities, while other industries have renewed their permits or have received others for installation of machinery in excess of 10,000 horsepower, despite the fact that they are the chief sources of pollution in the area.

"We should not destroy," said Mr Levendis, "within the space of a few short decades this city of ours, which has been honored down through the millennia. We ought to exert all our powers to save it from the death which threatens us in the form of pollution.

"We asked that an antipollution station be created which could study and continually control the polluting of the sea and the atmosphere, but the appropriate state services, using various excuses, did not grant the permit for its establishment, despite the fact that we had both the money and the building for housing it. It would have operated under the supervision of the EMP [Greek Metsovion Polytechnic School].

"Through repeated messages, steps taken, and resolutions by this municipal council and by other municipalities in this area, we have asked the Ministry of Industry to not grant new permits for the establishment of industries in our area, nor permits for expanding those which are now here. But they did not listen to us.

"The sea in the Elefsis Gulf has been dead for some time. At the discharge sites of the "Khalyvourgiki" the sludge of wastes extends 6 meters from the sea bed. Everything has died in the sea. We are at a loss as to how to live.

"Our city cannot be destroyed to enrich a very few people who (moreover) do not live here, or who seldom visit our city.

"Thus instead of ravaging our historic city, the holy city of Demeter and Persephone and the Eleusinian mysteries, we should first of all plan on the removal of the blast furnace and the coke oven, which cause the greatest mischief, and then of the more unhealthy industries which are not able to install modern purification systems.

"All this must be done now, in order to save our children. Now that the municipality is doing well in many sectors. The matter of the hospital is beginning to take on flesh and bones--contributions have already reached 40 million drachmas--and soon a day-care and nursery center is going to be built by the Labor Hearth, while in the cultural sector there has been noteworthy activity, its acme being the Aiskhyleia. It is already certain--that is, it has been scheduled--that this coming 3 September, President of the Republic K. Tsatsos will perform the unveiling of the statue of Aeschylus in our city."

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GREECE

FRENCH EXPERTS TO STUDY ATHENS POLLUTION

Athens AKROPOLIS in Greek 7 Jul 77 p 1

[Text] Foreign environmental specialists are coming to Athens in order to study specific problems of environmental pollution caused by industries.

The foreign experts are two Frenchmen who have been called in by the directorate of the environment of the Ministry of Industry. They will work here for 3 months.

The operation of the department of cattle-breeding of the "Khropei" company was suspended yesterday, after a charge was made to the environmental policing service that it is polluting the environment with bad odors.

Minister of Industry K. Konofagos--who gave the order for the closure of operations--stated that this department had been established without authorization and illegally.

Meanwhile, a pollution control chemical laboratory has been established and is operating in Nea Ionia. This laboratory, which is equipped with all the modern electronic equipment, will concern itself with analyses of industrial wastes. Minister of Industry Konofagos conducted a review yesterday of the facilities of this laboratory.

It should be noted that the wastes from the paper manufacturing outfit are no longer being diverted to the Pineios River, because the management of the company has complied with the instructions of the minister of industry and has completed the facilities for the treatment of wastes.

Four traffic policemen and four traffic gendarmes who have been added to the manpower of the environmental policing service will be exclusively concerned with pollution of the environment caused by the exhaust fumes of automobiles. The taking on of these people into the service was done through a joint recommendation of the ministers of industry and of coordination.

FRG RIVER POLLUTION REVIEWED

Hamburg DER SPIEGEL in German 13 Jun 77 pp 86-87

[Article: "Environment: From All Pipes"]

[Text] The waste water flood is rising, although the federal government and the states, communities and industry are investing billions in purification facilities. A new water quality map shows how much West German rivers are already polluted.

The river runs murky, decays, and smells even against the wind. Almost 70 years ago, the poetess Else Lasker-Schueler described it as the "blackest river in the world," Baedeker calls it the "proletarian among the rivers of Germany," and to those living in the Rhineland, the right tributary of the Rhine is the stream of fate--whoever is broke or otherwise near the end, "crosses the Wupper."

The river itself, 115 kilometers in length, has been dead for a long time. It is true, near its source where the Wupper is still called Wipper, the water bubbles as clearly as ever through the mountainous countryside. However, not later than Wuppertal, 57 kilometers before it flows into the Rhine, the river changes into a foul-smelling cesspool.

The sewage from a million inhabitants and over 2,000 industrial plants, most of the time not sufficiently purified, finds its way into the dirty canal, approximately 100 million cubic meters per year. In the opinion of the Association for Pure Water "Wupperverband," the effect of this flow is that next to the Emscher the Wupper, when compared to all comparable rivers, is the one containing the largest amount of sewage."

Water scientists from Nordrhein-Westfalen qualified the lower part of the Wupper as "extraordinarily polluted," and the Laender Study Group on Water (LAWA) explains what this classification generally means:

Water sections with excessive pollution through oxygen-consuming organic sewage; process of decay prominent; for long periods of time low or no concentration of oxygen;

populated primarily with bacteria, flagella, and tiny organisms; fish are absent; in case of strong toxic content biological desolation.

According to the LAWA, the Wupper "must be considered as polysaprobic. That means: the river is "overtuned" and ecologically dead for kilometers.

Such insight is transmitted through a water quality map, published recently by the LAWA, on which the pollution of West German rivers and lakes (date: 1975) has been presented for the first time in color according to unified criteria classified by quality. The condition of water in the nation: more than gloomy.

Clean water (blue on color map)--rich in oxygen, few bacteria and a variety of fish is to be found only in a few reservoirs and a few rivers at their sources. After that the color changes and sometimes the water gets thicker: The water scientists discovered that most of the bodies of water are "critically polluted" or horribly dirty, many have already suffocated in their own mire.

The decline has affected almost all streams and rivers up and down the country--from the Traun to the Treene, from the Ruhr to the Regen; according to the LAWA "most of them are in a condition which is in need of improvement."

The classification of the bodies of water was made according to biological and ecological investigations and according to chemical and physical measurements. Special attention was given to pollution through organic matter which is diminished biologically through oxygen.

On the other hand, the evaluation ignored "hygienic-bacteriological aspects," poisonous trace elements, and organic combinations which are not easily degradable--pollutants which cause the biggest problems in the purification of waste waters.

In order to achieve only "moderate pollution" for all rivers, the federal government, Laender, communities, and industry are investing amounts in the billions for sanitation programs with varying success: The LAWA indicated that waste water removal programs which had been put into operation in several states had already shown the "first signs of success"--soon this will also take place with respect to the Wupper, where toward the end of last year a large water treatment plant for the community's waste water was put into operation. A representative of the Wupper Association hopes that "by the end of the seventies" with additional means the "river will be restored."

However, the committee complained that in other areas the condition of the water has continued to deteriorate. An increase in pollution of rivers has taken place even where "all waste water from residential and industrial areas enter after complete biological or an equivalent treatment."

The water supply people do not doubt that the evaluation in various areas would have been more negative if they had had last year's data at their disposal instead of those from 1975, because with the economic recession the flood of sewage also declined. For with the increase in production pollutants appeared again in full force out of all pipes: For instance, in the Rhine the pollution content of some pollutants has more than doubled since 1975.

Those who produce the most pollution were named publicly last week in Wiesbaden, where the "International Committee On Water Works in the Rhine Area" (IAWR) met: the cellulose factories in Mannheim and Strasbourg, the Rhone Poulenc Chemical Concern in Alsace, Bayer AG in Leverkusen, and the cities of Basel and Strasbourg.

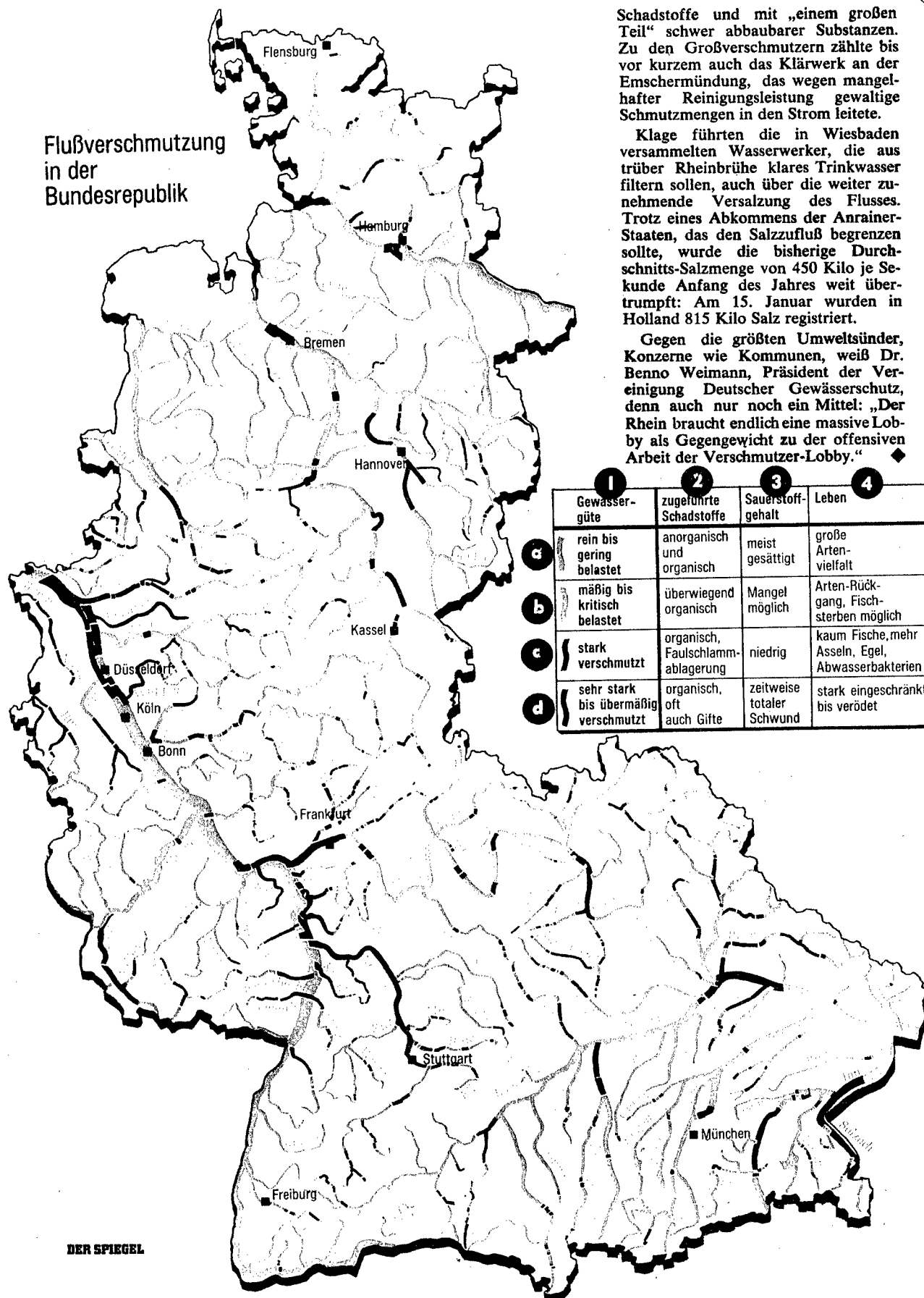
According to the IAWR, these six "big ones" alone discharge into the Rhine approximately half of the biodegradable pollutants and a "large share" of those substances that disintegrate only with difficulty. The large polluters included until recently a sewage treatment plant near the mouth of the Emscher, which because of its insufficient purification capacities discharged enormous amounts of pollutants into the river.

Complaints were made by people from the water works who are supposed to filter clear drinking water from the murky Rhine water. At a meeting in Wiesbaden they also complained about the constantly increasing salination of the river. In spite of an agreement between the riparian countries, which was supposed to limit the salt flow, the average amount of salt, which had been 450 kilos per second, had increased by the beginning of the year substantially: On 15 January 815 kilos of salt were registered in Holland.

Dr Benno Weimann, president of the Association for the Protection of German Bodies of Water, knows of only one means against the biggest environmental sinners: "The Rhine definitely needs a massive lobby as a counterweight to the offensive work of the polluters' lobby."

[The black-and-white map reproduction below does not give as clear a picture of the degrees of pollution as the four-color map in the original. For those interested, the color map is in DER SPIEGEL of 13 Jun 77 p 87]

Flußverschmutzung in der Bundesrepublik



Schadstoffe und mit „einem großen Teil“ schwer abbaubarer Substanzen. Zu den Großverschmutzern zählte bis vor kurzem auch das Klärwerk an der Emschermündung, das wegen mangelhafter Reinigungsleistung gewaltige Schmutzmengen in den Strom leitete.

Klage führten die in Wiesbaden versammelten Wasserwerker, die aus trüber Rheinbrühe klares Trinkwasser filtern sollen, auch über die weiter zunehmende Versalzung des Flusses. Trotz eines Abkommens der Anrainer-Staaten, das den Salzzufluß begrenzen sollte, wurde die bisherige Durchschnitts-Salzmenge von 450 Kilo je Sekunde Anfang des Jahres weit übertrumpft: Am 15. Januar wurden in Holland 815 Kilo Salz registriert.

Gegen die größten Umweltsünder, Konzerne wie Kommunen, weiß Dr. Benno Weimann, Präsident der Vereinigung Deutscher Gewässerschutz, denn auch nur noch ein Mittel: „Der Rhein braucht endlich eine massive Lobby als Gegengewicht zu der offensiven Arbeit der Verschmutzer-Lobby.“ ♦

| | 1 | 2 | 3 | 4 |
|---|--|--|---------------------------------|---|
| | Gewässer- güte | zugeführte Schadstoffe | Sauerstoff- gehalt | Leben |
| a | rein bis gering belastet | anorganisch und organisch | meist gesättigt | große Arten- vielfalt |
| b | mäßig bis kritisch belastet | überwiegend organisch | Mangel möglich | Arten-Rück- gang, Fisch- sterben möglich |
| c | stark verschmutzt | organisch, Faulschlamm- ablagerung | niedrig | kaum Fische, mehr Asseln, Egel, Abwasserbakterien |
| d | sehr stark bis übermäßig verschmutzt | organisch, oft auch Gifte | zeitweise totaler Schwund | stark eingeschränkt bis verödet |

DER SPIEGEL

Key:

| | 1 | 2 | 3 | 4 |
|---|---|--|------------------------------------|--|
| | Water quality | Introduced pollutants | Oxygen content | Life |
| a | pure to little pollution | inorganic and organic | mostly full | large variety of species |
| b | moderate to critical pollution | primarily organic | lack possible | variety decreasing dying of fish possible |
| c | heavy pollution | organic deposit of sludge | low | few fish, more isopods, leeches, waste water bac- teria |
| d | very heavy to excessive pollution | organic, frequently also poisons | at times total disappearance | strongly restricted to desolate |

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WEST GERMANY

RHEIN COAL WORKS RESTORE OLD, OPEN NEW MINING AREAS

Duesseldorf HANDELSBLATT in German 10/11 Jun 77 p 44

[Article by Eberhard Krummheuer: "The New Lake and the Dying Village: Contradictions in the Brown Coal Region Near Cologne"]

[Text] Just yesterday gigantic industrial machinery was in operation; today, in the same spot, fish, young ducks, and bathers are romping about. Today there is still a cultural landscape, developed over the centuries, tomorrow giant steam shovels will dominate the same area. This is reality in the region between Cologne and Aachen--where strip-mining of brown coal dominates life. The plans have barely been finalized to dig the biggest strip-mining hole in the world in Hambach near Dueren, where the region shows itself also from its better side. The Gotteshuelfe mine near Huerth does not exist any longer. It has been changed into a lake surrounded by greenery.

And consequently the Rheinische Braunkohlenwerke AG--usually called Rheinbraun--is visibly happy to demonstrate the other side of its business. Hans Bremshey, press agent for the company, which year after year produces up to 120 million tons of brown coal, stated briefly that each new beginning produces unrest, objections from the affected population. "Our re-cultivation promises are frequently met with doubt."

The lake, 53 hectares in size, in the shadow of the smoking chimneys of the industrial center of Knapsack, from where the view roams across the plains around Cologne to the skyline of Cologne with the slender, black silhouette of the cathedral, is supposed to be proof of Rheinbraun's "great love for detail."

It is approximately 2,400 meters long, the depth of the water is at least 2 meters, and consequently designed to be used as a regatta lake. On its northeast shore, white sand has been brought in by the community of Huerth for a 300-meter area--the first sign of a beach, the only other sign of it being a construction site for a parking lot.

The greenery all around the lake is somewhat sparse. How could it be more substantial when until the fall of last year steam shovels were still at work. But the newly-planted young trees show a little bit of the love for detail: The 142-hectare wooded area is a colorful picture of a variety of trees. The monotony of earlier cultivations belongs to the past. Parts of it can be seen still today in the recreational park Kottenforst-Ville, located to the south and containing many lakes. A 15-kilometer net of hiking paths opens up the forest and the lake shore.

The Cologne enterprise spends around DM 100 million a year for recultivation in the five strip-mining areas in the triangle between the cathedral city, Duesseldorf, and Aachen. Among many other measures is, for instance, the planting of between 2 and 2.5 million trees each year. The company is silent about the expenses for each individual project--as is the case here concerning the former Gotteshuelfe mine. The finances needed differ so much from case to case, which may cause misunderstandings among the affected communities, if the bare figures were apportioned according to the recultivated area.

However, the Cologne Mining Office, as the appropriate supervisory authority, provides an approximate value: The reforestation of 1 hectare of land costs on the average DM 7,000--not included are expenses for filling holes or additional excavations. In the case of the regatta lake, approximately 325,000 cubic meters of unusable clay had to be removed.

Use Still Not Clear

Ten years ago, the community of Huerth had already agreed to name the lake after the deceased mine director, Otto Maigler. But how the water can be used by those seeking recreation is even today not clear. According to current regulations, the 38th lake in the southern strip-mining area can be used only by swimmers and rowers. The ban on sailing and wind surfing will probably continue. The final decision can only be made by a registered association similar to the Erholungspark Ville e.V. Until that time, however, the residents of large and small towns in the surrounding area of the water hole will already have taken possession of it in their own manner.

A few kilometers to the west, words like recultivation and use of leisure time will remain foreign words for decades. Between Juelich and Grevenbroich, not far from the highway between Aachen and Duesseldorf, the village of Koenigshoven is dying a slow death. It has to make room for the strip-mining operation Fortuna Garsdorf.

The construction of the community Neu-Koenigshoven has been finished for some time; it is more modern, more attractive than the old village could ever have been. But for the citizens this digging for the most important and cheapest energy source of the Federal Republic meant not only good-bye to their homes but also a financial adventure. Naturally, Rheinbraun

cannot and must not take away anything from anybody without paying for it. But whatever those who were affected were able to get in more or less clever negotiations, conducted individually in talks with the industrial giant, can only relate to the current value. And in each case it will only be sufficient to finance a fraction of the new beginning. Not even the granting of low-interest credits can help to alleviate the discomfort of the citizens of Koenigshoven.

And the next step will soon be taken. After President Heinz Kuehn signs the declaration of commitment, the fate of a number of additional villages will be sealed. Beginning with 1978, excavators will plough through the soil between Dueren, Juelich and Bergheim--the Hambach strip-mine will start its work, which will reach into the next millenium.

The strip-mining field is approximately 85 square kilometers in size. The new generation of excavators developed specifically for Hambach with a daily capability of 240,000 cubic meters will dig up to 470 meters down into the soil. In addition to the problems of resettling, the moving of the highway Koeln-Aachen, several streets and railroad lines, there are the concerns of geologists and ecologists. Will nature be able to adjust to this interference? Disturbances of the soil during the mining process, which could lead to regular earthquakes, are feared as much as problems with the water supply if the groundwater level near Hambach is lowered to 500 meters below the surface of the earth. But nobody can give any definitive answers to these questions now.

More specific are the recultivation plans by Rheinbraun. Gradually, an area of 48 square kilometers of woods and fields and 34 square kilometers of water are supposed to come about. In the process, the holes of Fortuna Garsdorf and the Frechen strip-mining operation will be partially filled. In addition, an artificial mountain, 180 meters high--the Sophienhoehe--will be created near Juelich. To the concern of the environmentalists the reply of the enterprise is: When the last old tree falls the growth in the recultivated areas will already be 50 years old.

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